REMARKS

Summary of the Office Action

In the Office Action, the drawings and specification have been objected to for various informalities.

Claims 1, 4, 12, 14 and 23 stand rejected under 35 U.S.C. § 112, 1st Paragraph, and claims 13 and 19 stand rejected under 35 U.S.C. § 112, 2nd Paragraph.

Claims 19 and 20 stand rejected under 35 U.S.C. § 102 (b) as being anticipated by the reference "Modeling of Coil Springs Using Parallel Mechanisms," 2000 to Kumagai (hereinafter *Kumagai*).

Claims 1-6, 8-18 and 21-23 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over *Kumagai* in view of "Instrumentation for Engineers and Scientists," 1999 to Turner (hereinafter *Turner*).

Claim 7 stands rejected under 35 U.S.C. § 103 (a) as being unpatentable over *Kumagai* in view of *Turner*, and further in view of U.S. Patent No. 5,797,191 to *Ziegert*.

Summary of the Response to the Office Action

Applicant proposes amending claims 16 and 18, and canceling claim 23. Accordingly, claims 1-22 are pending for further consideration.

Objection to the Drawings

In the Office Action, formal drawings have been requested.

As requested, Applicant herewith provides formal drawings, Figs. 1-7.

Applicant therefore respectfully requests withdrawal of the objection to the drawings.

Objection to the Specification

In the Office Action, the disclosure has been objected to for not displaying the side force 26 in Fig. 2.

As requested, Applicant herewith provides formal Fig. 2 including side force 26.

Applicant therefore respectfully requests withdrawal of the objection to the disclosure.

35 U.S.C. § 112, 1st Paragraph Rejection

In the Office Action, claims 1, 4, 12, 14 and 23 stand rejected under 35 U.S.C. § 112, 1st Paragraph.

With regard to claim 1, the Office Action indicates that the steps "measuring the torques," and "deriving a spring design based upon the measured forces and measured torques" are not disclosed in the specification. In this regard, Applicant respectfully directs the Examiner's attention in particular to Paragraphs 34 and 37-39, and the related discussion for the equations listed in Paragraphs 24-30, and generally, the remaining Paragraphs 21-23, 31-33, 35-36 and 40, which clearly describe the features of force field generator 42 and the steps discussed in Paragraphs 34 and 37-39 for performing the functions recited in claim 1.

With regard to claims 4, 12 and 14, which have been rejected for reasons similar to those discussed above for claim 1, Applicant respectfully directs the Examiner's attention to the same Paragraphs as discussed above for claim 1.

With regard to claim 23, the Office Action requests clarification for the term "Johnson Platform." Applicant respectfully proposes canceling claim 23.

Applicant therefore respectfully requests withdrawal of the rejection of claims 1, 4, 12, 14 and 23 under 35 U.S.C. § 112, 1st Paragraph.

35 U.S.C. § 112, 2nd Paragraph Rejection

In the Office Action, claims 13 and 19 stand rejected under 35 U.S.C. § 112, 2nd Paragraph.

With regard to claim 13 and 18, the Office Action indicates that the use of the trademark/trade names MARC or ADAMS is indefinite. In this regard, Applicant proposes amending claims 13 and 18 as shown above.

Applicant therefore respectfully requests withdrawal of the rejection of claims 13 and 19 under 35 U.S.C. § 112, 2nd Paragraph.

All Claims are Allowable

In the Office Action, claims 19 and 20 stand rejected under 35 U.S.C. § 102 (b) as being anticipated by the reference "Modeling of Coil Springs Using Parallel Mechanisms," 2000 to Kumagai (hereinafter *Kumagai*). Claims 1-6, 8-18 and 21-23 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over *Kumagai* in view of "Instrumentation for Engineers and Scientists," 1999 to Turner (hereinafter *Turner*). Claim 7 stands rejected under 35 U.S.C. § 103 (a) as being unpatentable over *Kumagai* in view of *Turner*, and further in view of U.S. Patent No. 5,797,191 to *Ziegert*. Applicant respectfully traverses the rejection of pending claims 1-22 for the following reasons.

With regard to independent claim 1, Applicant respectfully asserts that *Kumagai*, *Turner* and *Ziegert*, viewed either singly or in combination, do not teach or fairly suggest a method for modeling a coil spring on a suspension system in terms of derived torque and force characteristics of the spring, the method including the steps of, "providing a force field generator for simulating the spring; securing the force field generator to the suspension system; activating the force field generator to produce forces for characterizing the spring; measuring the forces; measuring the torques; and deriving a spring design based upon the measured forces and measured torques," as recited in independent claim 1.

Support for these features recited in claim 1 can be found in particular in Paragraphs 34 and 37-39 of the original specification (Paragraphs 38 and 41-43 of the published specification), and the related discussion for the equations listed in Paragraphs 24-30 of the original specification (Paragraphs 25-34 of the published specification), and generally, in the remaining Paragraphs 21-23, 31-33, 35-36 and 40 of the originally filed specification (Paragraphs 22-24, 35-37, 39-40 and 44 of the published specification), and in Figs. 1-7 of the originally filed drawings. Specifically, as shown in Figs. 2-7, the present invention provides a method for modeling a coil spring on a suspension system in terms of derived torque and force characteristics of the spring. As shown in Fig. 2, the method includes the steps of providing a force field generator 42 for simulating the spring (similar to spring 14 in Fig. 1). The method further includes the steps of securing the force field generator to the suspension system at upper and lower end joints 50, 52. Once secured to the joints, the method includes the steps of activating the force field generator to produce forces for characterizing the spring, measuring the

forces and torques, and deriving a spring design based upon the measured forces and measured torques.

The Office Action cites *Kumagai*, *Turner* and *Ziegert* as teaching or suggesting the method recited in pending claims 1-22.

Kumagai, as noted in the Office Action, discloses a force field generator (see Fig. 3a of *Kumagai*), which is a six degree-of-freedom parallel mechanism. The force field generator may be used to simulate a coil spring. Further, in use, forces and torques between the upper and lower seats of the force field generator may be used to study desirable characteristics useful for designing coil springs.

While it is clear *Kumagai* does indeed disclose a force field generator, *Kumagai* however does not disclose utilizing a force field generator to mimic spring characteristics by actually installing the generator into an automobile suspension system for testing purposes.

For example, as discussed in the original specification, Paragraph 1 (Paragraph 2 of the published specification), "[t]he invention pertains to a method and apparatus for modeling coil springs and in particular to a method employing a force field generator on a suspension system to simulate the actual coil spring behavior so that the spring and suspension system may be tested without making actual coil springs."

As discussed in Paragraph 10 (Paragraph 11 of the published specification), "[t]he method allows a designer to simulate spring behavior and test a suspension using such a spring without using finite element analysis techniques and without having to make a spring in order to perform the tests."

Further, as discussed in Paragraph 12, "[t]he method also permits the designer to physically realize the performance of a newly designed spring with its integrated mechanical system. For example, if a physical model is available, and if the characteristics of the new spring are realized, it is possible to test the performance of the new spring integrated in a mechanical suspension system without a physical prototype of the spring. In other words, it is possible to test the performance of the spring without making a spring.

Therefore, whereas *Kumagai* discloses use of a force field generator for simulating a coil spring, the present invention goes well beyond the coil spring simulation disclosed by *Kumagai* by actually using a force field generator to mimic spring characteristics by actually

installing the generator into an automobile suspension system for testing purposes, measuring the resultant forces and torques, and thus deriving a spring design based upon the measured forces and measured torques.

The noted techniques for measuring the forces and torques, and thereafter using the forces and torques for deriving a spring design are disclosed in particular in Paragraphs 34 and 37-39 of the original specification (Paragraphs 38 and 41-43 of the published specification).

For example, as discussed in Paragraph 34 of the original specification:

> "Fig. 5 illustrates an exemplary hydraulic circuit for operating the hydraulic cylinders shown in Fig. 4a and 4b. The hydraulic circuit 90 includes a hydraulic pump 92 which is coupled to hydraulic cylinder 94 through a control valve 96, as shown. The cylinder 94 is connected to a load 98 which may be represented by the opposed upper and lower plates, and a force sensor 100 is secured between the cylinder 94 and the load 98. The force sensor produces an output which is coupled to an amplifier 102 which provides a feedback signal as an input to a PC having an input/output board 104. The output of the I/O board 104 is coupled to an amplifier circuit 106, which provides feedback to a proportional pressure reducing valve 108 which is coupled in the fluid circuit between the hydraulic pump 92 and the cylinder 94. The arrangement in Fig. 5 may be used to control the forces on the load exerted by each of the cylinders and in this way a spring may be modeled or characterized by the forces produced by the hydraulic cylinders."

As discussed in Paragraph 39 of the original specification:

> "When the side force acts on the damper, the pressure is concentrated on the sealed portion of the damper. ..... The simulation is carried out by moving the tire 20 upward which the degrees of freedom of the force field generator 42 are constrained. When all the forces on the cylinders are sensed, the side force is calculated. The side force may be that associated with a normal spring or a pitch control spring, the latter reducing the side force due to the countervailing moment produced by such a spring. As illustrated, the pitch control spring cancels a portion of the bending moment acting on the damper and as a result, the magnitude of the side vector 22 is also smaller than one with a

normal spring. By suitable manipulation of the variables, the side force produced by the normal spring in the pitch control spring may be optimized for the system."

Thus by using a force field generator for mimicking spring characteristics by actually installing the generator into an automobile suspension system, the present invention enables the derivation of an optimal spring design based upon the measured forces and measured torques, without the requirement of making an actual spring.

As it can be appreciated, this benefit is of great importance in that an actual spring is no longer required to test with an automobile suspension system, but the force field generator is itself installed into an automobile suspension system.

With regard to the teachings of *Turner* and *Ziegert*, which have been respectively cited for measuring forces and torques, and the use of an actuable link with a universal joint, Applicant respectfully asserts that *Turner* and *Ziegert* fail to overcome the aforementioned deficiencies cited in the teachings of *Kumagai.*

Based on the discussion above, Applicant therefore respectfully asserts that *Kumagai*, *Turner* and *Ziegert*, viewed either singly or in combination, do not teach or fairly suggest a method for modeling a coil spring on a suspension system in terms of derived torque and force characteristics of the spring, the method including the steps of, "providing a force field generator for simulating the spring; securing the force field generator to the suspension system; activating the force field generator to produce forces for characterizing the spring; measuring the forces; measuring the torques; and deriving a spring design based upon the measured forces and measured torques," as recited in independent claim 1.

As pointed out in MPEP § 2131, "[t]o anticipate a claim, the reference must teach every element of the claim." "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. Of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). Moreover, as pointed out in M.P.E.P. § 2143.03, "[t]o establish prima facie obviousness of a claimed invention, all the claimed limitations must be taught or suggested by the prior art". *In re Royka*, 409 F.2d 981, 180 USPQ 580 (CCPA 1974). Since these criteria have not been met, Applicant respectfully asserts that the rejections under 35 U.S.C. §§ 102 (b) and 103 (a) should

be withdrawn because *Kumagai*, *Turner* and *Ziegert* do not teach or suggest each feature of independent claim 1.

In view of the above arguments, Applicant respectfully requests the rejection of independent claim 1 under 35 U.S.C. §§ 102 and 103 be withdrawn. Additionally, claims 2 and 3, which depend from independent claim 1, are allowable at least because their base claim is allowable, as well as for the additional features recited therein.

Independent claim 4

With regard to independent claim 4, Applicant respectfully asserts that *Kumagai*, *Turner* and *Ziegert*, viewed either singly or in combination, do not teach or fairly suggest a method for modeling a coil spring in terms of torque and force characteristics to produce a spring design for an automobile suspension, including the steps of, "assembling a mechanism having spaced apart moveable platforms and a plurality of actuable links interconnecting the platforms at corresponding joints on opposite ends of each link; specifying a kinematics relationship between the platforms and the links; applying the mechanism to the suspension system; actuating the links to generate corresponding applied forces and torques at each joint; measuring the applied forces and torques; and deriving the force and torque characteristic of the spring to be designed based upon the kinematics and the corresponding applied forces and torques at each joint," as recited in independent claim 4.

Applicant respectfully asserts that independent claim 4 is allowable for at least the reasons presented above for the allowance of independent claim 1, and the additional features recited therein. Additionally, claims 5-18 which depend from independent claim 4, are allowable at least because their base claim is allowable, as well as for the additional features recited therein.

Independent claim 19

With regard to independent claim 19, Applicant respectfully asserts that *Kumagai*, *Turner* and *Ziegert*, viewed either singly or in combination, do not teach or fairly suggest an apparatus for modeling a coil spring on a suspension system in terms of derived torque and force characteristics of the spring including, "a force field generator for simulating the spring, said

force field generator secured in the suspension system, and means for activating the force field generator to produce forces therein for characterizing the spring," as recited in independent claim 19.

Applicant respectfully asserts that independent claim 19 is allowable for at least the reasons presented above for the allowance of independent claim 1, and the additional features recited therein. Additionally, claims 20-22 which depend from independent claim 19, are allowable at least because their base claim is allowable, as well as for the additional features recited therein.

CONCLUSION

In view of the foregoing, Applicant respectfully requests reconsideration and the timely allowance of the pending claims. Should the Examiner feel that there are any issues outstanding after consideration of the response, the Examiner is invited to contact the Applicant's undersigned representative to expedite prosecution.

If there are any other fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 04-2223. If a fee is required for an extension of time under 37 C.F.R. §1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account.

Respectfully submitted,

DYKEMA GOSSETT PLLC

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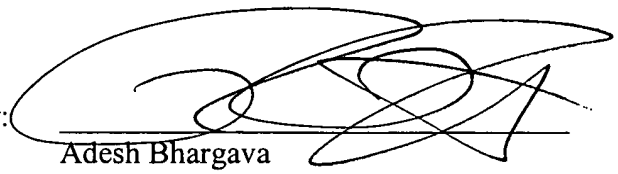
By: 

Adesh Bhargava
Reg. No. 46,553

DYKEMA GOSSETT PLLC
1300 I Street, N.W., Suite 300 West
Washington, D.C. 20005
(202) 906-8696